

November 4, 2004

Mr. Karl W. Singer
Chief Nuclear Officer and
Executive Vice President
Tennessee Valley Authority
6A Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE
BROWNS FERRY NUCLEAR PLANT, UNITS 1, 2 AND 3, LICENSE RENEWAL
APPLICATION (TAC NOS. MC1704, MC1705 AND MC1706)

Dear Mr. Singer:

By letter dated December 31, 2003, Tennessee Valley Authority (TVA) submitted an application pursuant to 10 CFR Part 54, to renew the operating licenses for the Browns Ferry Nuclear Plant, Units 1, 2 and 3, for review by the U.S. Nuclear Regulatory Commission (NRC). The NRC staff is reviewing the information contained in the license renewal application (LRA) and has identified areas where additional information is needed to complete the review. Specifically, the enclosed requests for additional information (RAIs) are related to the Electrical and Instrumentation & Control Systems, Section 3.6. Drafted forms of these RAIs were discussed with TVA staff on a telephone conference call on July 28, 2004.

Based on discussions with Ken Brune of your staff, a mutually agreeable date for your response to the RAIs is within 30 days from the date of this letter. If you have any questions regarding this letter or if circumstances result in your need to revise the response date, please contact me at (301) 415-1594 or by e-mail at yks@nrc.gov.

Sincerely,

/RA/

Yaira K. Diaz-Sanabria, Project Manager
License Renewal Section A
License Renewal and Environmental Impacts Program
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Docket Nos. 50-259, 50-260 and 50-296

Enclosure: As stated

cc w/encl: See next page

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**BROWNS FERRY NUCLEAR, UNITS 1, 2 AND 3
LICENSE RENEWAL APPLICATION
REQUEST FOR ADDITIONAL INFORMATION (RAI)
ELECTRICAL AND INSTRUMENTATION AND CONTROL SYSTEMS
SECTION 3.6**

RAI 3.6-1

Explain the aging effects of temperature (hot spot) and moisture on the existing components including cables during the long non-operational period of Unit 1.

RAI 3.6-2

Discuss if any non-environmental qualification (EQ) cables and connections are excluded from the scope of license renewal. If so, provide a discussion how these excluded cables that share the same conduit and tray with the in-scope cables are treated.

RAI 3.6-3

It is not clear from the description of AMP B.2.1.3, "Inaccessible Medium Voltage Cables Not subject to 10 CFR 50.49 Environmental Qualification Requirements" which cables are covered by this program.

- (a) Please provide a list of cables that are covered under this program.
- (b) The operating experience should address plant specific and industry operating experience regarding the water-treeing phenomenon or any expected decrease in the dielectric strength of the conductor insulation.
- (c) Also, please provide details (ten elements) of the aging management program.

RAI 3.6-4

With regard to AMP B.2.1.40, "Bus Inspection Program," please provide the following:

- (a) Clarify what is meant by in-scope portions of isolated and non-segregated phase bus associated with the unit station service transformers, main transformers, and common station service transformers. Also, provide a description how the aging of start bus 1A and 1B and shutdown bus 1 and 2 will be managed.
- (b) Under Element 3, you have stated that "The bus enclosure will be visually inspected for foreign debris, excessive dust built up, and evidence of water intrusion." Please clarify if this inspection will cover inside of the bus enclosure for foreign debris, excessive dust built up, and evidence of water intrusion. Also, confirm that internal supports and insulators will be inspected for structural integrity and sign of cracks, if not, discuss how the aging of internal supports and insulators will be managed. The acceptance criteria (Element 6) needs to be modified accordingly.

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- (c) In the operating experience section of your submittal, please address the plant specific and industry operating experience for bus failures.

RAI 3.6-5

In LRA Section 3.6.2.3.1, you have concluded that no AMP is required for fuse holders. However, please address the following:

- (a) On page 3.6-6, it is stated that fuse holders are protected by their location within a controlled environment. Discuss how a controlled environment provides protection of fuse holders. The discussion should include temperature, humidity, and radiation level of controlled environment.
- (b) Fatigue may be caused by frequent cycling of fuses when subject to significant loading which would cause the clips to expand and contract and to experience fatigue failure. Discuss why this condition is not a concern.
- (c) In order to make an aging management decision, the actual condition of the fuse holders needs to be evaluated to assess the extent of use. Please perform a visual inspection of the fuse holders and provide your findings or explain why an assessment of their current condition is not necessary.

RAI 3.6-6

Accessible Non-EQ cables and connections inspection program (B.2.1.1) which is consistent with GALL XI.E1 will manage the aging effects so that the cables will perform their intended functions for the extended period of operation. Power uprate at Browns Ferry Nuclear (BFN) may change the plant design environment. Additionally, fire retardant cable coating (flamastic) has been applied to unqualified cables. Provide a discussion why the above mentioned program is applicable to BFN.

RAI 3.6-7

On Page 3.6-13, you have stated that to prevent formation of aluminum oxide on bolted connection surface, the connections have a silver plating and are covered with grease to prevent air from contacting the connection surface. Discuss the grease replacement program including frequency of grease application.

RAI 3.6-8

Additionally, torque relaxation for bolted connections is a concern for switchyard bus connections and transmission conductors connections. An electrical connection must be designed to remain tight and maintain good conductivity through a large temperature range. Meeting this design requirement is difficult if the material specified for the bolt and the conductor are different and have different rates of thermal expansion. For example, copper or aluminum bus materials expand faster than most bolting materials. If thermal stress is added to stresses inherent at assembly, the joint members or fasteners can yield. If plastic deformation occurs during thermal loading (i.e., heatup) when the connection cools, the joint will be loose. Provide a discussion why torque relaxation for bolted connection is not a concern for BFN.

RAI 4.4-1

Provide a list of components covered under the EQ TLAA.

RAI 4.4-2

Section 4.4 of the LRA identified Environmental Qualification of Electric Equipment as a time-limited aging analysis (TLAA) requiring an evaluation by 10 CFR 54.21(c)(1). The provisions of 10 CFR 50, Appendix A, General Design Criteria (GDC) 4 require that all equipment related to safety be designed to accommodate the environmental effects of postulated accidents. Similarly, NRC SRP 3.11 (NUREG-0800) applies equally to mechanical and electrical equipment. For mechanical equipment in the LRA that are required to be evaluated as a environmental qualification (EQ) TLAA, provide a discussion on the materials that are sensitive to environmental effects (e.g., seals, gaskets, lubricants, fluids for hydraulic systems, diaphragms, and wear cycle aging from lubricant deterioration) and the aging analyses that will be or have been conducted to satisfy the requirements of 10 CFR 54.21(c)(1) for the period of extended operation.

RAI 4.4-3

Will the current requirements of 10 CFR 50.49 be applied in the qualification of the new components?

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BROWNS FERRY NUCLEAR PLANT

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- 2 - **BROWNS FERRY NUCLEAR PLANT**

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